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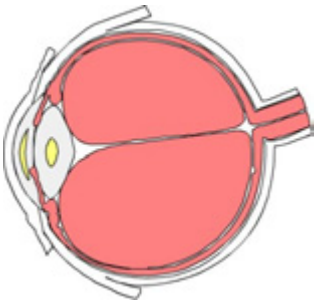
Macular Degeneration
Reference Summary

Age-related macular degeneration, or AMD, is a disease that affects central vision. AMD is a common cause of vision loss among people over 60 years old. Since AMD usually only affects central vision, people rarely go blind from AMD. However, it can sometimes make it difficult to perform daily activities that require fine, central vision. This reference summary explains what age-related macular degeneration is and treatment options for it.

Anatomy

Our eyes are very sophisticated optical organs that collect light and focus it on the back of the eye, allowing us to see.



The cornea is the front, transparent part of the eye. It allows light to enter the eye. The eye is covered with an outer layer known as the sclera. The conjunctiva is another layer that covers the front part of the eye that is exposed to the outside.

Light hits the iris, the colored part of the eye. The opening in the middle of the iris is called the pupil. The iris controls the amount of light entering the eye by changing the size of the pupil. As light passes through the pupil, it goes through a clear lens. Like the lens of a camera, the lens of the eye focuses the light onto the back of the eye. The capsule holds the lens in place. After reaching the lens and before reaching the back of the eye, the light rays travel through a transparent substance called the vitreous. The back of the eye is called the retina. The retina changes light signals into electric signals. These electric signals are sent through the optic nerve to the brain, which translates these signals into images.

The macula is in the center of the retina. Light is focused onto the macula. There, millions of cells change the light into nerve signals that tell the brain what is being seen. This is called central vision.

With central vision, we are able to read, drive, and perform other activities that require fine, sharp, straight-ahead vision. The fovea is the central part of the macula and accounts for the most detailed central vision.

Macular Degeneration

Macular degeneration is a disease that causes the cells in the macula to die, which leads to blindness.

There are 2 types of macular degeneration: wet and dry.

Dry macular degeneration is the most common, affecting about 90% of people who have this disease. Vision loss with dry macular degeneration is not as severe as vision loss with the wet type.

In dry AMD, cells in the macula start dying off for no known reason. With less functioning macula, central vision decreases over time.

Dry AMD often occurs in just one eye at first. Later the disease may also involve the other eye. Doctors have no way of knowing if or when both eyes may be affected, but dry AMD usually progresses slowly. Wet macular degeneration occurs when new blood vessels behind the retina start to grow toward the macula. Since new blood vessels are very fragile, they often leak blood and fluid under the macula. Blood and fluid leaks can damage the macula, which causes rapid loss of central vision. Although only 10% of AMD patients have the wet type, it is responsible for 90% of all severe vision loss caused by AMD.

Risks & Symptoms

The risk of getting AMD increases with age. Results of a large study show that people in their 50s have a 2% chance of getting AMD. This risk rises to 30% after the age of 75.

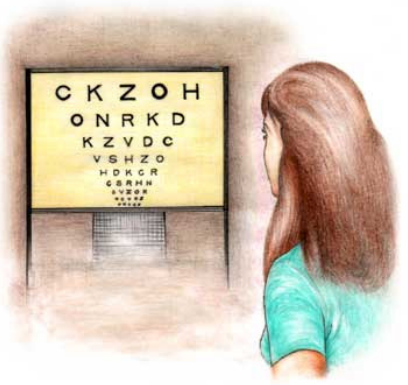
Besides older people, other people at a higher risk of getting AMD are:

- women
- smokers
- people with a family history of AMD
- people with high cholesterol

The most common symptom of dry AMD is slightly blurred vision. People with AMD may need more light for reading and other tasks. They may also find it hard to recognize faces until they are very close. Neither dry nor wet AMD causes any pain.

As dry AMD gets worse, people may see a blurred spot in the center of their vision. Over time, the blurred spot may become larger and darker. People with dry AMD in one eye often do not notice any changes in their vision until both eyes are affected. An early symptom of wet AMD is that straight lines appear wavy. This happens when the newly formed blood vessels leak fluid under the macula. The fluid raises the macula from its normal place at the back of the eye and distorts vision.

Another sign of wet AMD is rapid loss of central vision, unlike the slow loss of central vision with dry AMD. As in dry AMD, however, one may also notice a blind spot.



Diagnosis

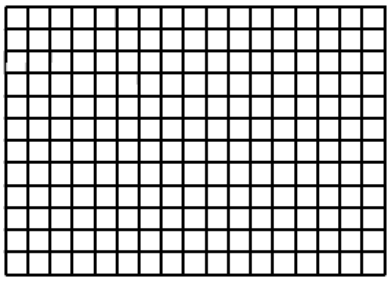
Since early signs of AMD may not be noticed, the best way to detect the disease is by having frequent eye exams.

A thorough eye examination should include a

- Visual acuity test: an eye chart test that measures how well a person sees at various distances.

- Pupil dilation: an examination that enables the eye care professional to see more of the retina and look for signs of AMD. To do this, drops are put in the eye to dilate, or widen the pupil. After the exam, vision may stay blurry for several hours.

A common sign of AMD is the presence of *drusen*, tiny yellow deposits in the retina that can be seen during an eye examination. If there are drusen, it does not always mean there is disease; it may mean the eye is at risk to develop more severe AMD. In eye care professional may ask the patient to look at an Amsler grid that has a checkerboard pattern. The patient covers one eye and stares at a black dot in the center of the grid.



Amsler grid

While looking at a dot on the Amsler grid, straight lines may look wavy or lines may seem to be missing. These could be signs of wet AMD. There is also an Amsler self-test that can be done at home. If your eye care professional thinks you have wet AMD, you may need to have a test called *fluorescein angiography*. In this test, a special dye is injected into a vein in the arm. Pictures are then taken as the dye passes through

the blood vessels in the retina. The photos help the eye care professional examine leaking blood vessels and decide if they can be treated.

Treatment Options

There are currently no treatments for dry AMD. That does not mean that people with dry AMD lose their sight. Fortunately, dry AMD develops very slowly. People with dry AMD lose some central vision over the years. However, most are able to lead normal, active lives, especially if AMD only affects one eye.

Wet AMD can sometimes be treated with laser surgery, where a high-energy beam of light is aimed directly onto leaking blood vessels. Laser treatment is more effective if the leaky blood vessels have developed away from the fovea, the central part of the macula. However, even if the blood vessels are growing right behind the fovea, the treatment can prevent further vision loss. If blood vessels keep leaking, more laser surgery may be needed. It is important to know that laser surgery is not a cure for AMD. It is only a treatment to prevent further vision loss.

The risk of new blood vessels growing back after laser treatment is fairly high.

In wet AMD a surgery may also be attempted by the ophthalmologist to move the macula away from the new blood vessels. During that operation the surgeon may also be able to take some of these new blood vessels out surgically. This operation is known as ‘macular translocation surgery’.

A new treatment has been developed for wet AMD that entails an injection in the eye every 6 weeks; one of the medications injected is pegaptanib, a compound that tends to stop the development of the new blood vessels in the retina.

There are ongoing research studies with laser treatments to see if that may help dry AMD.

It is very important to check with your ophthalmologist frequently as new treatments are always being investigated and some of them may be found to be effective.

Managing AMD

If you have dry AMD, you should:

- have your eyes examined through dilated pupils at least once a year.

- get an Amsler grid so you have a quick and inexpensive test to evaluate your vision each day for signs of wet AMD. It works best for people who still have good central vision.

- check your vision by reading the newspaper, watching television, and just looking at peoples' faces. Testing each eye separately is also very important. If you detect any changes, you should have an eye exam.

If you have wet AMD, and your eye care professional recommends that you have laser surgery, you should do it right away. After surgery, you should have frequent eye exams to check for any more leaking blood vessels. Smokers have a higher risk of recurrence than non-smokers do. You should keep checking your vision at home with the Amsler grid or other methods. Schedule an eye exam immediately if you notice any changes.

Some lifestyle and nutritional changes have been found to prevent or delay AMD. These include:

- Stopping smoking

- Eating foods rich in antioxidants such as leafy greens, fruits and vegetables

- Taking supplemental vitamins and minerals under your doctor's supervision. Vitamins A, C and E as well as zinc and copper may be helpful

- Wearing sunglasses that block ultraviolet light

Vision Loss

Normal use of the eyes does not hurt vision. Even if a person has lost sight because of AMD, they should not be afraid to use their eyes for reading, watching TV, and other daily activities. Low vision aids, special lenses, or electronic systems that make images appear larger, are available to help people make the most of their remaining vision.

Groups and agencies, as well as schools of medicine or optometry, offer information about counseling, training, and other special services for the visually impaired.

Summary

Age-related macular degeneration is a serious eye disease. Early detection and treatment, especially for wet AMD, can be crucial in preventing major vision loss.

Frequent eye examinations and are effective ways of preserving vision!